

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
25 July 2002 (25.07.2002)

PCT

(10) International Publication Number  
**WO 02/057637 A2**

- (51) International Patent Classification<sup>7</sup>: **F16B**
- (21) International Application Number: **PCT/EP02/00375**
- (22) International Filing Date: **15 January 2002 (15.01.2002)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:  
**0101501.5**      **19 January 2001 (19.01.2001)**      **GB**
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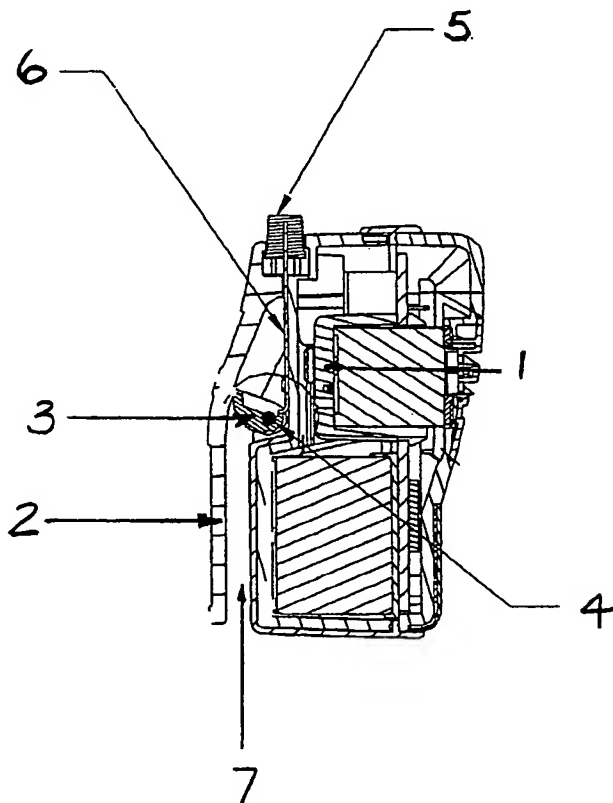
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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,

[Continued on next page]

(54) Title: **ATTACHMENT CLIP**



(57) Abstract: A means for fastening articles to clothing comprising a clip that, in conjunction with the casing of the article, forms a slot into which clothing will fit, a rotatable cam provided within the slot and pivoting on a pin, the cam being held against the inside surface of the clip by return spring the means further comprising a release mechanism to retract the cam against its return spring so that the article can be removed from the clothing, the means is particularly useful for attaching alarms such as personal gas detectors to industrial clothing.

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GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent  
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

- *without international search report and to be republished upon receipt of that report*

**ATTACHMENT CLIP**

The present invention relates to a clip that may be used to attach articles and in particular to attach articles to clothing. Many articles are attached to clothing in every day life, for example, beepers, mobile phones and various alarm and warning devices. Whilst the present invention has generally applicability it is especially useful for attaching alarm devices to clothing and in particular for the attachment of personal gas detectors to clothing.

Current means of attachment comprise fixing which may damage the clothing, adhesive attachment with materials such as Velcro, which are not reliable, and the article may fall off which is of particular concern with alarm or warning devices. Furthermore adhesive attachment can damage or soil the clothing when the article is removed.

Similarly clips have been used which form a slot into which the clothing fits. In these systems the clip itself is flexible and is used as the element that grips the clothing. Hereagain this can damage the clothing and there is a risk that the clip will weaken over time and the article will fall off and be lost. Such a system is illustrated in United States Patent 3907182.

The present invention therefore provides a means which enables an article to be clipped to clothing that overcomes the problems mentioned above. In a further aspect, the means also contains an easy to use release mechanism.

The present invention therefore provides a means for fastening articles to clothing comprising a clip that, in conjunction with the casing of the article, forms a slot into which clothing will fit, a rotatable cam provided within the slot and pivoting on a pin, the cam being held against the inside surface of the clip by a return spring, the means further comprising a release mechanism to retract the cam against its return spring so that the article can be removed from the clothing.

In the device of the present invention the clip is not used as the gripping element. Unlike other forms of clips it is the cam which grips onto clothing. The cam is preferably moulded from a plastic or from rubber which may be rigid or compliant, in a preferred embodiment the cam is moulded from a slightly compliant rubber material. The cam preferably has a

roughened or serrated outer surface to increase the grip on the clothing. The shape of the cam and the orientation relative to the inside surface of the rigid clip is such that clothing may pass into the slot between the clip and the casing of the article, pushing the cam back against its return spring. Once the clothing is in place the spring pushes the cam against the clothing which cannot pull out of the slot as the cam jams the clothing against the inside surface of the clip. When present the rubber material and surface serrations of the cam prevent clothing from sliding over the cam. The mechanism has the benefit that the greater the force applied to pull the clothing out of the slot, the tighter it is gripped. The cam mechanism is preferably located within the clip to prevent damage.

The clip is preferably made of metal although it may be made of rigid plastic.

The release mechanism is preferably an actuator plate operated by a pushbutton so that the article may be released from the clothing and removed simply by depression of the button so that the actuator causes the cam to rotate and release the clothing.

The present invention is particularly useful when the article is an alarm such as a small personal gas detector.

Personal gas detectors are typically used to warn personnel in industrial plant of the presence of toxic gases or the absence of oxygen in the atmosphere. The detector is body worn, normally in the breast pocket of industrial overalls, boiler suits and the like. A strong and reliable means of fixing must be provided to ensure the detector is not lost in use. The 'One-way' mechanism of the present invention makes it easy to fix gas detectors on to clothing without substantial damage to the clothing. The device is also very hard to remove without deliberately releasing the actuator. This has safety benefits as it is extremely unlikely that the personal gas detector will accidentally fall off the clothing. The release mechanism is preferably a release button, easy to operate, a pushbutton being particularly convenient.

The present invention therefore provides an attachment mechanism which is easy to apply and difficult to release accidentally. When used with alarm systems such as gas detectors this considerably reduces the likelihood of the detector being lost and therefore improves the safety of the users.

The present invention is illustrated but in no way limited by the accompanying drawing which shows a cross sectional view of a clip mechanism when used with a personal gas detector.

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In Figure 1, 1 is the main body of a personal gas detector, 2 is a rigid metal clip, 3 a serrated cam including a return spring, 4 is a pivot pin about which the serrated cam 3 can rotate. 5 is a pushbutton release mechanism and 6 is an actuator which when the pushbutton is depressed causes the cam to rotate about the pivot pin.

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Accordingly in operation the device may be placed over the clothing so that, for example, the pocket or lapel passes into the slot 7 defined between the clip and main body of the detector. Once in place the downward weight of the gas detector will cause the serrated cam to grip the clothing and attach the device securely to the clothing. When it is desired to

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remove the device from the clothing the pushbutton may be depressed whereby the actuator causes the cam to rotate and release the clothing.

**CLAIMS**

- 5 1. A means for fastening articles to clothing comprising a clip that, in conjunction with the casing of the article, forms a slot into which clothing will fit, a rotatable cam provided within the slot and pivoting on a pin, the cam being held against the inside surface of the clip by a return spring, the means further comprising a release mechanism to retract the cam against its return spring so that the article can be removed from clothing.
- 10 2. A means according to Claim 1, in which the cam is moulded from a plastic.
3. A means according to Claim 1, in which the cam is moulded from rubber.
- 15 4. A means according to any of the preceding Claims, in which the cam has a roughened surface.
5. A means according to any of Claims 1 to 3, in which the cam has a serrated surface.
- 20 6. A means according to any of the preceding Claims, in which the release mechanism is an actuator plate operated by a pushbutton.
7. A means according to Claim 6, in which depression of the pushbutton causes the cam to rotate and release the clothing.
- 25 8. A means according to any of the preceding Claims in which the article is an alarm.
9. A means according to Claim 8, in which the article is a personal gas detector.

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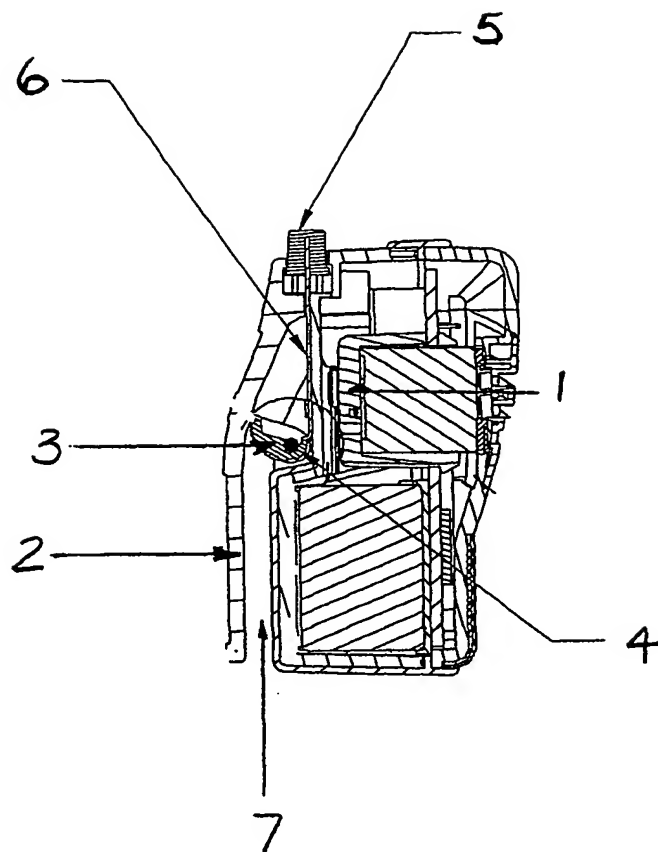


FIG.